Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of locating an entry in a forwarding database corresponding to a longest match of an address, the method comprising:

    (a) applying a mask to the address to determine a masked address that is to be used for purposes of locating a matching entry in the forwarding database; ~~and~~

    (b) searching the forwarding database for an entry that matches the masked address; and

    (c) performing an address-sensitive decimation of the mask to produce a new mask.

2. (Original) The method of claim 1, further comprising the step of performing a hash function on the masked address to produce an index into a hash table.

3. (Previously Presented) The method of claim 2, wherein the step of performing an address-sensitive decimation of the mask to update the mask comprises shortening the mask so that the application of the mask to the address will exclude data to cause the hash function to produce a result that is different from the former index by shortening the length of the mask to X-Y bits, where X represents the bit position of the most significant bit in the address, and where Y represents the bit position of the least significant bit containing a one.

4. (Previously Presented) The method of claim 1, further comprising:

    (d) repeating operations (a)-(c) with the new mask until a predetermined condition has been met.

5. (Currently Amended) The method of claim 4, wherein the predetermined condition comprises a matching entry has been located or the length of the mask is equal to a predetermined threshold.

6.   (Previously Presented) The method of claim 4, wherein one or more new masks are generated in parallel with the searching the forwarding database for a matching entry.

7.   (Original) The method of claim 1, wherein each entry in the forwarding database includes N-bits of address and an associated mask length encoded in N+1 bits of address information, and the step of searching the forwarding database for a matching entry comprises the steps of:

determining the mask length associated with an entry based upon the location of a mask length identification marker within the address information;

comparing the mask length associated with the entry with the mask that has been applied to the address; and

if the mask length associated with the entry is less than or equal to the mask that has been applied to the address, then comparing a significant portion of the address information with the masked address, the significant portion of the address information being identified by the mask length associated with the entry.

8.   (Original) The method of claim 7, wherein the mask length identification marker comprises the least significant bit in the address information containing a one, and wherein the step of determining the mask length associated with an entry based upon the location of a mask length identification marker within the address information comprises scanning the address information to locate the bit position of the least significant bit containing a one.

9.   (Previously Presented) A method of locating an entry in a forwarding database corresponding to a longest match of a search key, the method comprising:

a)   searching the forwarding database for an entry that matches the search key; and

b)   if no entry matches the search key, then

1)   scanning the search key to locate the least significant bit containing a one,

2)   shortening the search key to exclude the least significant bit containing a one and any lesser significant bits containing a zero than the least significant bit containing the one,

3)   searching the forwarding database for an entry that matches the search key, and

4)   repeating steps 1-3 until the search key is equal to a predetermined length or until the longest match is located.

10.   (Original) The method of claim 9, wherein the step of shortening the search key to exclude the least significant bit containing a one comprises the steps of:

providing a mask of length X-Y, where X represents the bit position of the most significant bit in the search key, and where Y represents the bit position of the least significant bit containing a one; and

applying the mask to the search key.

11.   (Original) The method of claim 9, wherein the search key comprises a destination Internet Protocol (IP) address.

12.   (Previously Presented) The method of claim 9, wherein the search key comprises a source Internet Protocol (IP) address.

13.   (Cancelled).

14.   (Cancelled)

15.   (Cancelled).

16.   (Cancelled).

17.   (Cancelled).

18.   (Cancelled).

19.   (Cancelled).

20.   (Cancelled).

21.   (Cancelled).

22.   (Cancelled).

23.   (Cancelled).

24.   (Cancelled).

25.   (Cancelled).

26.   (Cancelled).

27.   (Cancelled).

28.   (Cancelled).

29.   (Cancelled).

30.   (Cancelled).

31.   (Currently Amended) A method of forwarding data comprising:

(A) receiving a search key;

(B) producing a masked search key by applying a mask to a portion of the search key starting at a least significant bit of the search key until a least significant bit of the masked search key containing a logic one value;

(C) performing a hash function on the masked search key to produce an index;

(D) comparing information stored within a bin of a forwarding mechanism, the bin being addressed by the index;

(E) determining whether a length of the mask is greater than a predetermined threshold concurrently with (C) and (D); and.

(F) repeating (B-E) for another search iteration if the information does not match the masked search key and the length of the mask is greater than the predetermined threshold.

32.   (Previously Presented) The method of claim 31, wherein, for each search iteration, the mask of the search key is shortened to exclude enough data to cause the hash function to produce a result that is different from a former index.

33.   (Previously Presented) The method of claim 32, wherein the shortening of the mask comprises, for each search iteration, shortening the length of the mask to X-Y bits, where X represents the bit position of a most significant bit in the search key and Y represents a bit position of the least significant bit in the search key containing a logic one value.

34.   (Previously Presented) The method of claim 31, wherein the search key comprises a destination Internet Protocol (IP) address.

35.   (Previously Presented) An address relocation unit for improving a longest match search, comprising:

a hash table including a plurality of bins;

a hash generator to produce an index from an input address and a mask, the index being used to recover data stored in a first bin of the plurality of bins;

circuitry to determine whether the data recovered from the first bin compares with the address; and

a mask decimation logic coupled to the hash generator, the mask decimation logic to shorten the mask supplied to the hash generator so that the hash generator produces a new index that differs from the index if the data recovered fails to compare with a portion of the address identified by the mask.

36.   (Cancelled).

37.   (Cancelled).

38.   (Cancelled).

39.   (Cancelled).

40.   (Cancelled).

41.   (Previously Presented) A method of locating an entry in a forwarding database corresponding to a longest match of a search key, the method comprising:

performing a function on the search key to produce a current index;

searching a first location in a table identified by the current index for an entry that matches the search key; and

if no entry is found that matches the search key, each subsequent search iteration performing the following:

shortening the search key to exclude data to cause the function to produce a result that differs from the current index,

updating the current index with the result, and

searching a second location in the table that is identified by the current index.

42.   (Previously Presented) The method of claim 41, wherein the performing of the function includes the performing of a hash function.

43.   (Previously Presented) The method of claim 41, wherein each subsequent search iteration being performed if no entry is found that matches a length of the search key is greater than a predetermined length.

44.   (Previously Presented) The method of claim 43, wherein the searching of the first location includes searching of a bin of a plurality of bins associated with the table.

45.   (Previously Presented) A method of locating an entry in a forwarding database corresponding to a longest match of a search key, the method comprising:

generating indices for a hash table performing a hash function on the search key to produce a current index into a hash table;

searching a first bin in the hash table identified by the current index for an entry that matches the search key; and

if no entry has been found that matches the search key, for each subsequent search iteration:

shortening the search key to exclude data to cause the hash function to produce a result that is different than the current index,

updating the current index with the result, and

searching a different bin in the hash table that is identified by the current index.

46.   (Previously Presented) The method of claim 44, wherein each subsequent search iteration being performed if no entry is found that matches a length of the search key is greater than a predetermined length.